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Notice of Allowability	Application No.	Applicant(s)	
	10/643,236	JAMES ET AL.	
	Examiner	Art Unit	
	Rip A. Lee	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- 1. ☒ This communication is responsive to January 26, 2006.
- 2. ☒ The allowed claim(s) is/are 1, 3-7, 10 and 12-22.
- 3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 - 1. ☐ Certified copies of the priority documents have been received.
 - 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

- 4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
- 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
- 6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

- Attachment(s)**
- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>08-18-03;12-02-04</u> | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance: Claims 1, 3-7, 10, and 12-22 are allowed over the closest references cited below.

The present invention is drawn to a nanocomposite optical plastic article comprising a plastic host material and a core shell nanoparticulate material dispersed into said plastic host article. Salient features include: (i) the core has a temperature sensitive optical vector that is directionally opposed to the temperature sensitive optical vector of the host, (ii) indices of refraction follow the relationship, $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$, and (iii) the cores comprises a material selected from ALON (aluminum oxynitride), aluminum oxide, BeO, CdS, CaCO₃, diamond, magnesium aluminate, MgF₂, MgO, potassium titanophosphate, silica, tellurium oxide, yttrium oxide, and ZnSe.

In another embodiment, the nanocomposite optical plastic article comprises a nanoparticulate material having a ZnS core and MgF₂ shell, wherein the relationship $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$ exists.

Copending application 10/642,779 is drawn to a nanocomposite optical plastic article comprising a plastic host material and a core shell nanoparticulate material dispersed into said plastic host article. Salient features include: (i) the core has a temperature sensitive optical vector that is directionally opposed to the temperature sensitive optical vector of the host and (ii) indices of refraction follow the relationship, $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$. The core material is not limited. The rejection of claims has been overcome by timely filing of a terminal disclaimer.

Duarte *et al.* (U.S. 6,888,862) discloses a core-shell nanoparticle composite article comprised of a ZnS core ($n = 2.35$) and a SiO₂ shell ($n = 1.455$) dispersed in PMMA ($n = 1.49$). In this example, the relationship recited in the claims, $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$, is obeyed. The core has a radius less than 40 nm, the shell has a thickness of less than 20 nm. The reference does not teach the subject matter of the instant claims because ZnS is not one of the core materials listed in the Markush group of the instant claims.

Ohtsu *et al.* (U.S. 2004/0007169) discloses a core-shell nanoparticles comprised of a CdS ($n = 2.416$) or CdSe ($n = 2.45$) core with a ZnS ($n = 2.35$) shell which are ultimately dispersed in PMMA in a 50/50 wt ratio. The nanoparticles have a particle size in the range of 0.5-20 nm, with a preferred upper limit of about 15 nm. The reference does not teach the subject matter of the instant claims because the condition, $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$, does not exist.

Sudarshan *et al.* (U.S. 2004/0105980) teaches preparation of core-shell nanoparticles having an average particle size of 1 nm to 500 μ . The core component is comprised of ceramic materials such as aluminum oxide ($n = 1.79$), silicon dioxide ($n = 1.455$), and magnesium oxide ($n = 1.723$), and the shell, having a thickness of 1 nm to 10 μ , may comprise any of the ceramic materials described previously. The core-shell nanoparticles are used to make an optical fluid by dispersing into PMMA ($n = 1.49$) matrix. The prior art fails to disclose incorporation of core shell particles such that the relationship, $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$, is exhibited. Listed compounds, aluminum oxide, silicon dioxide, and magnesium oxide are three of a broad selection of ceramic materials, and therefore, it is the examiner's position that one of ordinary skill in the art, would not have found it obvious to select the three cited compounds from the large listing of materials shown in the patent. Selection of these compounds is less obvious in light of the fact that core shell particles of Sudarshan *et al.* are ceramics. Even if the artisan were truly skilled to cull these three materials, it would not have been obvious to make the claimed nanocomposite where the relationship, $n_{\text{shell}} < n_{\text{host}} < n_{\text{core}}$, is exhibited.

Torimoto *et al.* (U.S. 2005/0082521) teaches a core shell material comprising a CdS core and a SiO_x shell, wherein the core shell has an adjustable void space. The patent neither teaches nor makes obvious the invention of the present claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Art Unit: 1713

Terminal Disclaimer

The terminal disclaimer filed on January 26, 2006, disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 10/642,779 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Drawings

The new drawings filed with the response of January 26, 2006, have been accepted.

Information Disclosure Statement


Information disclosure statements of August 18, 2003 and December 2, 2004 are included in this notice. Corrections were made in the latter IDS.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

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April 12, 2006


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